POPULATIONS AT RISK

Housing Status and Health Care Service Utilization Among Low-income Persons with HIV/AIDS

Meredith Y. Smith, PhD, MPA, Bruce D. Rapkin, PhD, Gary Winkel, PhD, Carolyn Springer, PhD, Rosy Chhabra, PsyD, Ira S. Feldman, MPS

OBJECTIVE: **To examine the impact of housing status on health service utilization patterns in low-income HIV-infected adults.**

DESIGN: **A survey of 1,445 HIV-infected Medicaid recipients in New York State between April 1996 and March 1997.**

MAIN RESULTS: **Six percent of study participants were homeless, 24.5% were "doubled-up," and 69.5% were stably housed. Compared with the stably housed, doubled-up and homeless participants were less likely to be seeing a physician regularly ($P = .0001$), and if seeing a physician, they were likely to have been doing so for a significantly shorter time ($P = .02$). The homeless were also less likely than either stably housed or doubled-up individuals to see the same physician or group of physicians at each ambulatory visit ($P = .007$). In addition, a higher proportion of the homeless had made one or more hospital visits over the prior 3 months than the nonhomeless. After multivariate adjustment, doubled-up participants were found to make more emergency room visits, the homeless were less likely to be taking prophylaxis for *Pneumocystis carinii* pneumonia, and both the doubled-up and the homeless were shown to use slightly more outpatient care than the stably housed.**

CONCLUSION: **Our study documents differences in health care utilization patterns across stably housed, doubled-up, and homeless HIV-infected persons after controlling for health insurance coverage. These differences, especially those pertaining to outpatient services, suggest that the unstably housed may be receiving less adequate health care than the stably housed, and hence may be more likely to experience adverse clinical outcomes.**

KEY WORDS: **housing; homelessness; doubled-up; human immunodeficiency virus (HIV); health care services utilization.**
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Received from the Derald H. Ruttenberg Cancer Center, Mount Sinai School of Medicine, New York, NY (MYS, GW); Department of Psychiatry, Memorial Sloan-Kettering Cancer Center, New York, NY (BDR, CS, RC); and AIDS Institute, New York State Department of Health, Albany, NY (ISF).

Address correspondence and reprint requests to Dr. Smith: Assistant Professor, Derald H. Ruttenberg Cancer Center, Mount Sinai School of Medicine, Box 1130, One Gustave L. Levy Place, New York, NY 10029 (e-mail: meredith.smith@mountsinai.org).

Lack of health insurance has been repeatedly identified as one of the most significant barriers to obtaining health care for persons with HIV/AIDS (PWHAs), especially for the estimated 9% nationally who are in unstable housing arrangements.[1,2] A major development over the past decade has been the emergence of Medicaid as the single largest health insurer for those with HIV/AIDS, a trend which has been fueled by the expansion of Medicaid eligibility to include persons in earlier stages of disease progression.[3] Several prior studies have shown a strong link between residential instability and the inadequate and/or inappropriate use of health care services among those with HIV/AIDS.[1,4–9] However, an important and as yet unanswered question is whether, after controlling for health insurance coverage, housing status affects the health service utilization patterns of HIV-infected persons.

In the present study, we sought to address this issue by examining the relation between housing status and health care utilization in a sample of HIV positive New York State Medicaid recipients. To understand this association fully, it is necessary to examine the spectrum of common housing patterns, ranging from stably housed at one extreme to homelessness at the other, with intermediate forms of residential instability, such as living "doubled-up" with friends, acquaintances, or relatives, falling in between.[10] The phenomenon of doubled-up housing is particularly important to examine because it is common in low-income groups such as our study population; is associated with a host of physical, social, and psychological problems that can affect health care services usage; and is also associated with homelessness in the immediate future.[10–12]

We hypothesized that stably housed PWHAs would exhibit the most appropriate patterns of care, reporting regular use of outpatient care (average of one visit every 3 months), a longer relationship with a physician, and fewer hospitalizations and emergency room visits than PWHAs living in a doubled-up situation.[13] In turn, we hypothesized that doubled-up individuals would show comparatively more appropriate patterns of health care than those who were homeless.

Our analysis was based on a behavioral model of health care utilization that specifies service use as a function of three sets of variables: background factors, such as gender, race/ethnicity, and education; resource-related factors that promote or inhibit health service usage, such

as income, health insurance, and source of health care; and medical need factors, such as stage of illness, functional status, and symptom burden that serve as the immediate impetus for accessing medical care.[8,14–17]

METHODS

We interviewed a nonprobability sample of 1,526 HIV-infected adult New York State Medicaid recipients as part of the HIV/AIDS Client Cohort Study, an ongoing, prospective research project funded under the Health Resources and Services Administration's Special Projects of National Significance Program.

Study eligibility criteria included being a New York State resident, receiving Medicaid, having an HIV-positive diagnosis, and lacking any gross cognitive impairment. Of the 1,526 face-to-face surveys conducted, 41 were excluded because of missing data on housing status and 40 because they were currently residing in some type of institution, resulting in a final sample of 1,445.

The study analysis was based on data from "baseline" interviews conducted between April 1996 and March 1997. Eighty-one percent of participants were residing in the metropolitan New York City region (including New York City, Westchester, and Long Island). The remaining 19% were from upstate counties, including Albany, Rochester, Buffalo, Erie, Orange, Putnam, and Onondaga. Individuals were recruited directly by trained research team members from community-based social and health service agencies, acute care facilities, and freestanding community-based medical clinics. Less than 2% of eligible individuals who were approached refused to participate. The most frequently cited reasons for refusal included concerns about confidentiality, the personal nature of the interview questions, lengthiness of the interview, and lack of interest in participating in research.

Participants were divided into three groups based on their housing status at the time of the initial interview: homeless, doubled-up, or stably housed. Individuals were classified as homeless if they were living on the street at the time of the interview or were currently residing in either a shelter or other "temporary place."[10,18] Participants were categorized as "doubled-up" if they reported that they were currently living in someone else's house or apartment.[10,11] Participants who reported that they were currently living in a place of their own were categorized as "stably housed."

Study data were obtained from face-to-face interviews, which were approximately 45 minutes in duration and conducted at the recruitment site. Interviewers were females with bachelor's degrees in sociology, psychology, or a related field. Respondents received $10 for completing the interview. The study was approved by the Institutional Review Board (IRB) at all participating sites with an IRB; other recruitment sites were covered under the IRB of the sponsoring institution, Memorial Hospital. Informed consent was obtained from each participant prior to commencement of the baseline interview.

The baseline questionnaire used both closed- and open-ended questions to obtain data concerning sociodemographics, health status and health risk factors, quality of life, and health care access and utilization. Interviews were conducted in both English and Spanish. A Spanish version of the questionnaire was developed using a method that employed translation and back-translation.

Main Outcome Measures

Self-Reported Health Status. The Medical Outcomes Study 21-Item Short Form (MOS SF-21) was used to assess self-perceived health and functioning over the prior 4 weeks.[19] The instrument consists of eight subscales, including (1) physical functioning, which measures performance of certain basic tasks or activities such as bathing, dressing and walking; (2) role functioning, which measures health-related limitations in meeting work and other daily responsibilities; (3) social functioning, which measures health-associated limitations in performing social activities; (4) emotional well-being, which assesses anxiety and depression; (5) pain, which measures degree of bodily pain and extent to which it interferes with performance of daily activities; (6) general health perceptions, which assesses perceived overall health status; (7) cognitive functioning; and (8) energy/fatigue. The measure has been tested in several HIV-infected populations and has been shown to have strong construct and known groups validity, with subscale reliabilities ranging from 0.78 to 0.85.[19]

Clinical Status. Participants were asked the date they were diagnosed with HIV and their most recent CD4+ cell count results. They were also asked whether and to what extent they had been experiencing 13 groups of symptoms commonly associated with HIV over the prior 4 weeks. Symptom groups included trouble with thinking or concentrating; depression, sadness, or trouble sleeping; aches, fatigue, lightheadness, or "weak-all-over"; fevers, chills, or sweats; poor appetite or weight loss; trouble with eyes or ears; trouble with nose or sinuses, or headache; trouble with mouth or swallowing; nausea, vomiting, diarrhea, or abdominal pain; coughing, wheezing, or chest pain, and/or trouble breathing; rash, itch, herpes, or other skin trouble; and numbness, tingling, or pain in an arm or leg.

Health Services and Medication Use. Service use was measured by a series of questions about three areas of health care: ambulatory, inpatient, and emergency room service utilization. Ambulatory care was assessed in terms of whether the individual had a physician whom he/she saw regularly for HIV treatment and/or monitoring; the mean number of months he/she had been seeing a physician regularly; whether the same physician (or group of physicians) was seen at each visit; and the mean number

of visits over the past 3 months. Inpatient and emergency room use was assessed in terms of whether the participant had ever used such care over the prior 3 months and, if so, how often. Antiretroviral utilization was assessed by asking the participant whether he/she was currently taking any antiretroviral drugs. To prompt participant recall, the interviewer displayed a card showing pictures of all the FDA-approved antiretrovirals. Participants were encouraged to point to the drugs they were currently taking. *Pneumocystis carinii* pneumonia prophylaxis therapy usage was determined by asking each participant if, over the past 3 months, he/she had been taking aerosolized pentamidine, Bactrim, Dapsone, Mepron, or any other antibiotic specifically developed to prevent *Pneumocystis carinii* pneumonia.

Health Risk-Related Behaviors. Participants were asked whether they had ever engaged in specific high-risk behaviors. Items included heroin use, crack use, cocaine use, other illicit drug use, sexual relations with an injection drug user, sexual relations with a person known to be HIV positive, involvement in the criminal justice system, and a history of sexually transmitted disease.

Demographic Characteristics. Background data on each participant's age, race/ethnicity, education level, gender, usual site of health care, current housing situation, and income level were collected.

Statistical Methods

Univariate and bivariate analyses were performed using SPSSX version 7.0 (SPSS, Inc., Chicago, Ill). Differences among homeless, doubled-up, and stably housed respondents in terms of select characteristics were examined using χ^2 for categorical variables and analysis-of-variance (ANOVA) procedures for continuous variables. A *t* test with a Bonferroni correction was used for post hoc testing purposes. Both SPSSX version 7.0 and SAS version 6.12 (SAS Institute, Cary, NC) were used to conduct multivariable analyses. Separate multiple regression models were developed for six dependent variables: (1) the number of ambulatory visits over the past 3 months; (2) the number of emergency room visits over the past 3 months; (3) the number of inpatient visits over the past 3 months; (4) the number of months seeing a physician regularly for HIV treatment and monitoring; (5) whether they were taking antiretroviral therapy; and (6) whether they took antibiotics over the past 3 months to prevent the *Pneumocystis carinii* pneumonia. The latter analysis was restricted to individuals with CD4 cell counts of 200 or less.

Since the outpatient, inpatient, and emergency room visits were count variables, we first inspected their distributions. Eight cases had extreme outlying values on these variables and were therefore eliminated from the analysis. As the data distributions showed severe skewing toward the lower end, we employed the SAS PROC GENMOD procedure, specifying a Poisson distribution and a log link function, first running an intercept-only model and then adding a single predictor variable at each successive step.[20]

On examination of the distribution of the variable "number of months seeing a physician regularly," two cases had values in excess of 200 months, the point at which the distribution tended to end. These two cases were excluded from this analysis. We then conducted ordinary least squares regression using backward elimination.[20] For the two medication utilization variables, we conducted logistic regression (taking drugs vs not taking drugs) using backward elimination.

A set of predictor variables was identified for inclusion in each model on the basis of a significant Pearson (for continuous variables) or point biserial (for dichotomous variables) correlation coefficient ($P < .10$) between the predictor and each dependent variable. Three sets of predictor variables were examined for significant correlations: background, resource-related, and medical need variables. Background factors included age, race/ethnicity (black vs other, Hispanic vs other); educational level (grade school or less vs other); gender; history of heroin use (yes/no); history of crack use (yes/no); history of other illicit drug use (yes/no); and location of residency (New York City metropolitan area vs other). Resource-related variables included housing status (homeless vs stably housed; doubled-up vs stably housed); income level (monthly personal income of $500 or less vs other), site of usual care (outpatient, hospital-based clinic vs other); and whether or not the participant reported "seeing a physician regularly for HIV treatment and monitoring." Medical need variables included self-reported CD4 cell count level; number of HIV-related symptoms experienced over the past 4 weeks; and self-reported pain, general well-being, health perceptions, physical, role, social, and mental health/emotional status over the past 4 weeks. Significant predictors for each dependent variable along with the parameter estimate or odds ratio values are presented in Tables 1 and 2.

RESULTS

Of the 1,445 PWHAs completing the baseline interview, 6% ($n = 87$) were homeless, 24.5% ($n = 352$) were doubled-up, and 69.5% were stably housed ($n = 1,004$). Of the homeless respondents, 92% reported currently living in a shelter, and 8% reported living on the street. The majority of both homeless and housed respondents were currently residing within New York City (87.4% and 80.4%, respectively).

Sociodemographics and Health Risk Behaviors

Compared with the nonhomeless, homeless respondents were less well educated ($P = .05$), and more likely to be male ($P < .05$) (Table 1). Homeless respondents also had significantly higher levels of health risk-related behaviors.

Table 1. Background Characteristics of HIV Positive Medicaid Recipients by Housing Status

Characteristic	Stably Housed (n = 1,004)	Doubled-Up (n = 354)	Homeless (n = 87)	P Value
Mean age, y (SD)	39.7 (7.3)	37.9 (7.0)	40.0 (7.5)	.001
Male, %	57.9*	67.9*	69.8	.001
Race/ethnicity, %				
White	16.6	19.0	9.9	.320
Latino	28.7	29.4	29.6	
African American	52.9	49.3	60.5	
Other	1.8	2.4	—	
Education, %				
Less than high school	42.3	46.0	55.4	.110
High school	44.5	41.6	33.7	
Some college or more	13.2	12.3	10.8	
Healthcare source, %				
Private doctor	2.1	1.7	3.5	.090
Hospital-based outpatient clinic	80.6	83.3	69.8	
Publicly funded community health center	17.3	14.9	26.7	
Mean CD4 cell count (SD)	307.5 (371.8)	293.8 (243.0)	320.9 (211.2)	.760
Years since HIV diagnosis (SD)	6.3 (4.3)	5.7 (3.2)	5.8 (3.1)	.050
Ever used heroin, %	53.6	48.5	63.5	.040
Ever used crack, %	54.8	57.2	70.9	.010

Values in each row with matching superscripts differ significantly at $P < .05$.

In particular, they were significantly more likely to have used crack ($P < .01$), heroin ($P = .07$), or other illicit drugs ($P < .01$), and to have had sex with an intravenous drug user and/or an HIV-infected partner than were participants in either stable or doubled-up housing arrangements. Compared with the stably housed, there was a trend for both homeless and doubled-up participants to have been involved with the criminal justice system ($P = .07$). Although no differences were found across the three groups in terms of self-reported health status, CD4 cell count level and number of symptoms, stably housed individuals had been diagnosed with HIV for a longer period of time ($P = .05$), and a

Table 2. Health Service Utilization by Housing Status for HIV Positive Medicaid Recipients

Outpatient	Stably Housed (n = 1,004)	Doubled-Up (n = 354)	Homeless (n = 87)	P Value
Percentage seeing a doctor regularly for monitoring and/or treatment of HIV	96.8%*,†	92.5%*	87.8%†	.0001
Percentage seeing same doctor (or group of doctors) for HIV treatment and/or monitoring	92.2%*	88.9%†	81.4%*,†	.007
Percentage able to reach the doctor during a medical emergency	84.2%	84.7%	77.8%	.330
Mean number (SD) of months seen by a doctor for HIV/AIDS care	45.9*,† (47.4)	40.2* (33.4)	33.8† (29.3)	.014
Mean number (SD) of outpatient visits over the past 3 months	3.3* (2.4)	3.4† (2.9)	3.7*,† (2.5)	.017
Use of Other Medical Services				
Mean number (SD) of emergency room visits over the past 3 months	1.8 (1.5)	2.1 (2.4)	1.8 (1.0)	.180
Mean number (SD) of hospitalizations over the past 3 months	1.5 (.9)	1.6 (1.0)	1.3 (.6)	.110
Percent reporting 1 hospitalization or more over the past 3 months				
Yes	21.3	26.6	30.2*	
No	78.7	73.4	69.8	
No antiretroviral therapy, (CD4 cell less than 0.50×10^9/L)	22.1	20.9	32.2	.070
Pneumocystis carinii pneumonia prophylaxis (CD4 cell less than 0.20×10^9/L)	63.9	57.7	50†	.009

*,† *Values in each row with matching superscripts differ significantly at* $P <$ .05 *or less.*
Number of participants with CD4 count ≤ 200 = 534.
Number of participants with CD4 count ≥ 201 and ≤ 500 = 482.

Table 3. Factors Independently Associated with Health Service Use in HIV-Infected Medicaid Recipients

	No. of Outpatient Visits*		No. of Emergency Room Visits†		Mean No. of Months Seeing Physician Regularly‡	
Predictor Variables	**Parameter Estimate**	***P* Value**	**Parameter Estimate**	***P* Value**	**Parameter Estimate**	***P* Value**
Homeless§	0.233††	.001			−10.526**	.012
Doubled-up §	0.087**	.022	0.161**	.047		
Has a physician §	1.208††	.001				
Physical‖	−0.004††	.001			−0.095#	.085
Role function‖	−0.002††	.001				
Pain level ‖			−0.005††	.001	−0.085**	.038
Grade school education or less §	−0.100††	.003	0.238††	.001		
Male §	0.060#	.081				
Age, y					0.333††	.001
Lives in New York City§					−5.921**	.016
CD4 cell count¶					−0.001††	.017
Hispanic§					3.712#	.088
Monthly income <$500§					−11.347††	.001

**Incremental log likelihood value = 181.15,* df = 7, P < .001.
†*Incremental log likehhood value = 29.16,* df = 4, P < .05.
‡R^2 = .064.
§*Dichotomous outcome measured* as *"yes/no."*
‖*Continuous variable with possible values ranging from 0 to 100.*
¶*Continuous variable with possible values ranging from 0 to 1,000.*
#P < .10; **P < .05; ††P < .01.

significantly higher percentage of homeless reported having had a sexually transmitted disease as compared with other participants ($P < .001$).

Service Utilization

Results regarding utilization of health services and medications are presented in Table 2. Although the majority of participants reported seeing a physician regularly for HIV-related care, distinct differences in outpatient service use emerged by housing status. A higher percentage of the stably housed were seeing a doctor regularly for HIV monitoring and treatment as compared with either the doubled-up or homeless (96.8% vs 92.5% and 87.8%, respectively; $P = .0001$). Of those seeing a doctor regularly, stably housed participants had been doing so for significantly longer on average than either the doubled-up or homeless ($P = .01$). Similarly, a higher percentage of stably housed and doubled-up participants had been seeing the same doctor (or group of doctors) for their outpatient care than homeless individuals ($P = .007$). However, homeless participants reported making more outpatient visits over the prior 3 months than either doubled-up or stably housed individuals ($P = .02$).

In terms of use of other medical services, a higher proportion of both doubled-up and homeless individuals reported having had at least 1 hospitalization over the prior 3 months as compared with the stably housed. In addition, homeless participants were less likely to be taking *Pneumocystis carinii* pneumonia prophylaxis than those in stable housing ($P = .009$).

Table 4. Factors Independently Associated with HIV-Related Medication Usage in HIV-Infected Medicaid Recipients

	Current Use of Antiretroviral Therapy* *n* = 940		Received *Pneumocystis carinii* Pneumonia Prophylaxis†, *n* = 940	
Predictor Variables	**Odds Ratio**	**95% Confidence Interval**	**Odds Ratio**	**95% Confidence Interval**
Homeless			0.265	0.105 to 0.671
Sees a physician regularly	1.24	0.116 to 0.512	6.878	2.288 to 20.672
Resides in New York City	0.6887	1.000 to 2.852		
Usual source of care is hospital-based clinic	1.5	0.336 to 0.775		
History of crack use	0.557	1.064 to 2.278		

**CD4 < .50 × 10^9/L,* R^2 = .057, df = 4, P < .10.
†*CD4 < 0.20 × 10 ^{9}/L,* R^2 = .058, df = 2, P = .001.

Multivariate Analyses

Multiple regression analyses, presented in Tables 3 and 4, identified factors that were independently associated with the six service utilization outcomes. No significant predictors were identified for number of inpatient visits made over the prior 3 months. However, being either homeless or in a doubled-up housing situation was associated with an increased number of outpatient visits. Other significant factors independently associated with number of ambulatory visits included having a physician one saw regularly for HIV treatment, poorer physical and role functioning, and male gender.

Significant predictors of the number of emergency room visits over the past 3 months included living in a doubled-up housing situation, having less than a high school education, and experiencing a higher level of pain over the past 4 weeks.

Housing status was also a significant predictor of number of months in physician care—those who were not homeless were more likely to have been under a physician's care for a longer time than those who were homeless. Other factors which independently predicted increased time in ambulatory care included Hispanic ethnicity, older age, residing outside metropolitan New York City, more pain, poorer physical functioning, and a lower CD4 cell count.

In terms of medication usage (see Table 4), homeless individuals were significantly less likely to be taking antibiotics for *Pneumocystis carinii* pneumonia than the nonhomeless, while participants who were seeing a physician regularly were more likely than those who were not to be currently taking such antibiotics. In comparison, housing status was not an independent predictor of current antiretroviral use. However, individuals whose usual source of care was a hospital-based clinic were more likely to be taking antiretroviral therapy, as were those who were seeing a physician. Participants who had a history of crack use and those who lived in New York City were significantly less likely to be taking antiretroviral medications than those who had no such history or who lived outside of the New York metropolitan area.

DISCUSSION

Over 30% of the HIV-infected Medicaid population we surveyed were unstably housed, of which the majority (24.5%) was living doubled up. This estimate is higher than that reported by Arno and colleagues, who found a 9% combined prevalence of homelessness and marginal housing nationally among persons with HIV.[1] Similar findings were also reported by Bonuck and Arno[21] as well as P. Messeri (personal communication, July 22, 1996), who found that 14% of the HIV-infected population were living in unstable housing conditions. One explanation for this discrepancy is that our sample was drawn exclusively from the Medicaid population, a group representing the lowest end of the socioeconomic spectrum and hence one which may be especially vulnerable to residential instability.

Contrary to our expectations, both the homeless and, to a lesser extent, the doubled-up reported more outpatient visits over the prior 3 months than the stably housed, differences which persisted even after controlling for sociodemographics and CD4 cell count. On average, the homeless made close to 4 outpatient visits within a given 3-month interval, a figure which exceeds that recommended for medical monitoring of AIDS.[13] This estimate may reflect the impact of having Medicaid coverage and may not be generalizable to all marginally housed persons with HIV.

Despite this greater number of outpatient visits, however, other aspects of outpatient utilization were less favorable for the unstably housed. First, both the homeless and the doubled-up were significantly less likely to see a physician regularly for HIV-related treatment and monitoring. Second, despite similar CD4 cell counts, doubled-up individuals had been under regular physician care for approximately 6 months less and homeless individuals for approximately 12 months less than the stably housed. Third, the continuity of outpatient care was significantly poorer for the homeless than for the stably housed.

A fourth indicator of differential outpatient care was that among those with CD4 cell counts of 200 or less, homeless participants were significantly less likely to be using *Pneumocystis carinii* pneumonia prophylaxis than the stably housed. The fact that approximately one third of our homeless participants had not used prophylaxis for *Pneumocystis carinii* pneumonia over the past 3 months is of concern given that this disease is highly communicable, and settings such as public shelters can facilitate its transmission.[22,23] However, our results corroborate Messeri et al.'s finding that HIV-infected individuals in unstable housing in New York City were more likely to receive an inferior quality of care than their stably housed counterparts, and that poorer quality primary care was associated with a reduced likelihood of taking *Pneumocystis carinii* pneumonia prophylaxis.[8]

However, we found no differences in the use of antiretroviral therapy by housing status. This result is surprising given that clinician reluctance to recommend antiretroviral regimens to homeless and marginally housed individuals has been acknowledged as a significant problem in the medical community. In addition, data from a contemporaneous, New York City–based study found unstable housing status to be independently associated with a decreased likelihood of using antiretroviral combination therapies.[24,25]

We also expected that the unstably housed would use more emergency room care than the stably housed. This hypothesis was partially supported: after adjusting for key covariates, doubled-up participants reported making more emergency room visits than the stably housed. However, the homeless did not, perhaps because they were using significantly more outpatient services than either the doubled up or the stably housed. This difference in service utilization patterns between these two "unstably housed" groups may reflect the fact that the homeless, by

virtue of being in the shelter system, are more visible to service providers and hence more likely to have medical needs identified and addressed in a timely manner than those living in doubled-up arrangements.[26]

Several study limitations are worth noting. First, because our data were cross-sectional, we cannot make causal inferences about the relation between housing status and health service utilization patterns. Given the dynamic nature of homelessness, it would be important to conduct longitudinal analyses in order to understand more fully how housing status affects health service utilization over time. Second, because we recruited predominantly from health care settings we may have underrepresented that portion of the HIV-infected Medicaid population who use the health care system infrequently or not at all, a group likely to have significant housing problems.

Third, we used self-reported information on CD4 cell count, date of HIV diagnosis, and health care service use without seeking further validation from medical charts or billing data. However, one recent study documented a high correlation between self-reported CD4 cell count and that recorded in the medical chart, and thus concluded that self-reported CD4 data may provide clinically adequate estimates of actual CD4 counts.[27] Several other large-scale studies of the HIV infected have also relied exclusively on self-report for information on CD4 cell count level.[9,27,28] Fourth, we did not distinguish between voluntary and involuntary doubled-up arrangements. Compared with voluntary arrangements, living involuntarily in doubled-up housing is a more accurate measure of residential instablity.[10]

Numerous HIV-related health care initiatives were underway in New York State at the time this study was conducted. These initiatives, which emphasized linking individuals into a comprehensive continuum of HIV treatment services, sought to expand the capacity for primary care delivery in a wide range of community and hospital-based settings; instituted family-centered, intensive case management for HIV-infected Medicaid recipients; and promoted the establishment of centers of excellence for HIV-related clinical care.[29,30] Together, these programs created a unique environment for the delivery of HIV-related health care, one potentially so unique as to restrict the generalizability of our study findings beyond New York State.

Our study documents distinct differences in health care utilization patterns across stably housed, doubled-up, and homeless HIV-infected persons after controlling for health insurance coverage. These differences, especially those pertaining to outpatient services, suggest that the unstably housed may be receiving less adequate health care than the stably housed and hence may be more likely to experience adverse clinical outcomes.

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